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ABSTRACT

A Texas study examined the attitudes of 379 secondary agriscience students abouf environmental issues (76% response rate). The Spring 1993 survey questionnaire was developed from a literature review. A Likert-type scale was used for response measurement in sections 1-4; Section 5 consisted of statements related to personal and demographic information. Attitudinal items were analyzed to develop a measure of "environmental attitude." Overall, agriscience students in Texas had a favorable environmental attitude. Students with favorable environmental attitudes believed the following: agriculture caused environmental problems; agriculturists were concerned about the environment; and information they received on the environment was fair and unbiased. Agriscience students who had completed and/or enrolled in "Wildlife Recreation and Management" were more likely to have a favorable environmental attitude than students who had not. Agriscience students preferred to receive information on the environment from their teachers more than any other source. Recommendations were environmental education that addressed students' concerns; access of agriscience instructors to objective environmental information; and longitudinal studies to determine the effect of students' favorable environmental attitudes on future agricultural and environmental policies. Contains 12 references.) (YLB)

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ATTITUDES ABOUT ENVIRONMENTAL ISSUES AMONG SECONDARY AGRISCIENCE STUDENTS IN TEXAS

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INTRODUCTION

In 1985, the National Research Council's Committee on Agricultural Education in Secondary Schools was created "to assess the contributions of instruction in agriculture to the maintenance and improvement of U.S. agricultural productivity and economic competitiveness here and abroad" (National Research Council, 1988, p. v.). In addition to several specific recommendations, the Committee requested that the subject matter taught be broadened and that this modification include the areas of environmental and resource management.

The inclusion of education on environmental and resource management in agricultural education can be attributed to several factors. First, agricultural leaders realize that future agriculturists will be faced with a multitude of environmental rules and regulations when they enter the agricultural work force. Second, agriculturists are generally considered to be stewards of the land. Last, because agriculture makes use of the environment and natural resources in an often intensive manner, the agricultural industry is sometimes looked upon by many as a threat to the environment. This stereotype is perpetuated when even a small minority of those in production agriculture are careless with such things as soil erosion, pesticide contamination, and animal welfare. Integration of environmental education into secondary education should help future agriculturists be more effective in implementing sustainable practices, and thus ease the negative publicity received by agriculture and its relationship with the environment and natural resources.

Arguably, no other subject taught at the secondary level can be as closely linked to the environment as can agriculture. As far back as the late 1970s, Baer (1978) and Batie (1979) stressed the need for education to address students' values and ethics as they relate to the environment and agriculture. In Texas, secondary agriscience programs already offer courses that include topics relating to natural resources and the environment. However, the agriscience educational materials on natural resources and the environment are often designed without a formalized process of securing student feedback. Ramsey, Hungerford, and Volk (1992) suggest that environmental education in general is "multifaceted, unorganized, fragmented, and probably ineffective" and that "environmental education, if it exists at all, is loosely organized and has little sense of direction" (p. 36). Newhouse (1990) suggests that it is necessary and crucial that attitudes of students be considered and applied when designing educational programs and curricula.

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To state the problem simply, knowledge and perceptions among students about environmental issues must be understood before comprehensive education programs dealing with these issues can be adequately developed (Whent, Andrews, Williams, & Weber, 1991).

Shetzer, Stackman, and Moore (1991) suggest that, in the business community, pro-environmental views of business students can be used to predict future environmental policy development. The same may be suggested for the area of agriculture. Environmental attitudes of agriscience students may serve as indicators of future agricultural policy toward the environment.

Addressing environmental issues in the classroom allows students to form opinions about certain issues or debate and discuss solutions to different environmental problems (Walter & Reisner, 1992). "As students of agriculture prepare to take their place in society, knowledge of critical issues facing agriculture will be essential" (Marshall & Herring, 1991, p.10).

This study was based upon Piaget's theory of cognitive development and the way in which this development relates to secondary students. Piaget's theory of cognitive development during adolescence involves the process of "formal thinking" (Piaget, 1958). This development allows a young person to go from drawing simple conclusions from factual information only, to including his or her own hypothetical possibilities when confronted with a problem or decision. Based on this theory, the participants in this study were believed to have developed or were currently developing their own personal attitudes toward environmental issues.

PURPOSE AND OBJECTIVES

The purpose of this study was to examine the attitudes of secondary agriscience students about environmental issues. The objectives were to (1) Determine selected personal and demographic information about students enrolled in secondary agriscience programs in Texas; (2) Determine attitudes of secondary agriscience students about environmental issues and their relationships with the industry of agriculture (3) Examine the relationships between personal and demographic characteristics and overall attitudes about the environment; and (4) Identify specific means by which students have gained knowledge of environmental issues.

PROCEDURES

The population of this study was all students in Texas enrolled in high school agricultural science courses in the Spring of 1993. Using Borg and Gall's (1989) sample population curve, it was determined that a sample of 370 individuals was needed to satisfy the required sample size for a population of 84,000. The cluster sampling technique was used with the agricultural science program as the cluster.

In order to accomplish the objectives of the study, a survey questionnaire was developed from a review of the literature. The questionnaire was divided into

five sections. A Likert-type scale was used for response measurement in sections one through four.

Section one contained statements related to opinions on natural resources. These resources were groundwater, surface water, air, endangered species, wildlife, and forests. Section two contained additional statements relating to opinions on high profile environmental issues that are often the center of media attention. These issues were industrial pollution, environmental protection, the greenhouse effect, ozone depletion, ocean dumping, and recycling. Section three contained statements relating to opinions about agriculture and its stewardship of the environment. Specifically, these statements related to the use of agricultural chemicals and farming techniques. Section four contained statements that determined where students receive information on the environment and from where they would like to receive information on the environment. This section also contained statements that determined the course offerings within the respondent's respective agriscience program. In addition to statements intended to measure attitude, section four required respondents to complete statements related to sources of information on the environment. Section five consisted of statements related to personal and demographic information.

A pilot test was conducted to determine if changes were needed in the survey instrument or its administration. Agriscience instructors from four schools were selected as participants and agreed to allow their students to participate in the pilot test. Appropriate modifications were made based on the recommendations and results of the pilot test.

Each of the participating agriscience programs was mailed a survey packet consisting of a cover letter, an information sheet for the instructor, twenty survey instruments for the students, pre-coded optical scanning sheets for each student, and a self-addressed postage-paid envelope for return of the scantron sheets to the researcher. After a follow-up letter and telephone calls to non-respondents, the final response rate for the study was 76%. This rate yielded 379 students, which was more than the number needed to satisfy the required sample size of 370.

ANALYSIS OF DATA

The data were analyzed using the Statistical Package for Social Sciences Release 4.1 (SPSS^x). Descriptive statistics were used to determine the overall sample frequency counts, percentages, and standard deviation for each item on the survey instrument.

The attitudinal items were analyzed to develop a measure of "environmental attitude." One scale was developed utilizing questions from sections I, II, and III. Twenty-two items were utilized to measure environmental attitude. Seven items were eliminated using both empirical and conceptual strategies to obtain the strongest internal consistency, while still maintaining the structure of the construct. The final value for internal consistency of the scale "Environmental Attitude" measured by Cronbach's Coefficient Alpha was .84.

After the construct had been developed, the SPSS^X procedures PEARSON CORR and ONEWAY ANOVA were used to determine if relationships existed between environmental attitude and variables related to the industry of agriculture. The same correlation procedures were used to determine if relationships existed between environmental attitude and selected personal and demographic variables. If an ANOVA was statistically significant then Scheffe's Test was used to determine which of the group means were different from the others.

Objective four was satisfied by running the statistical analysis FREQUENCIES. Frequency values were used to identify means by which students had gained knowledge of the environment.

RESULTS

A majority of the respondents were 17 years of age or younger and male. The characteristic hometowns or communities of the respondents were farms or ranches to small towns which were either rural farming areas or suburban areas with some farming. The majority of respondents' schools were size 3A or smaller (schools having an enrollment of 714 students or less in grades 9 through 12). Over seventy percent of the respondents did not belong to an environmental or conservation organization. Seventy percent said they had been hunting. About half said that their households practice recycling, and 40% attended schools that participated in recycling programs.

Objective two was to determine the attitude of secondary agriscience students about the environment and its relationship with the industry of agriculture. Items #1-6, #8, #12-19, #21-26, and #29 were used to create the construct for environmental attitude in this analysis. Table 1 contains the mean and standard deviation for each statement used to develop the construct for environmental attitude. A mean score approaching zero was indicative of a favorable environmental attitude, and a mean score approaching four indicated an unfavorable environmental attitude. The mean scale score related to environmental attitude for the entire sample was 1.0 indicating that, overall, agriscience students had a favorable environmental attitude.

Once the construct for environmental attitude was developed, the construct scale was correlated to two survey items (#27 and #28) to determine if relationships existed between environmental attitude and beliefs about the industry of agriculture. Item #27 stated, "People involved in agriculture are **not** concerned with protecting the environment." Item #28 stated, "Agricultural techniques cause many environmental problems."

Correlation between environmental attitude and the belief that agriculture causes many environmental problems was found to be significant at the .01 level. This was a "slight," positive correlation; on the other hand, no significant correlation was found for environmental attitude and the belief that agriculturists are not concerned with the environment.

Objective three was to examine the relationships between personal and demographic characteristics and attitude about the environment. Items #1-6, #8,

Table 1 - Responses to Statements Concerning Environmental Issues Related to Natural Resources

	Statement	Mean[a,b]	SD
#1	Groundwater must be protected from harmful chemicals.	.31	.62
#2	Surface water (lakes, rivers, streams, ponds, oceans) should be protected from harmful chemicals.	.25	.50
#3	Strict laws and regulations should apply to people who handle chemicals that may affect our groundwater.	.51	.68
#4	Air pollution may significantly affect me within my lifetime.	.88	.92
#5	Industries that cause air pollution should be heavily fined if they break the law.	.67	.84
#6	More protection is needed for endangered animal and plant species.	.66	.83
#8	All wild animals are important to the earth's ecology.	.77	.85
#12	The United States government should try to protect forests in other countries from destruction.	1.29	1.20
#13	More government regulation is needed to decrease pollution.	.82	.79
#14	Our nation can do more to protect the environment.	.55	.73
#15	Protecting the environment is just as important as fighting crime.	.98	1.06
#16	Protecting the environment is just as important as fighting the drug problem.	1.26	1.20
#17	Our generation must do all it can to keep environmental problems from affecting future generations.	.57	.78
#18	The greenhouse effect may significantly affect the earth during my lifetime.	1.32	1.02
#19	Ozone depletion may significantly affect the earth's atmosphere during my lifetime.	1.22	1.01
#21	I think that recycling should be mandatory in my community.	1.16	1.16
#22	I am willing to pay more for things I buy, if I am helping to preserve natural resources.	1.68	1.18
#23	I am willing to pay more for food that contains no chemicals or preservatives.	1.72	1.13
#24	Small family farms practice more environmentally "friendly" farming techniques than large corporate farms.	1.37	.96
#25	Farmers use too many chemicals on their crops.	1.75	1.12
#26	Farmers, ranchers, and all other agriculturists should use techniques that protect the environment.	.79	.88
#29	Organically grown fruits and vegetables are healthier than those grown with human-made chemicals.	1.35	1.04

a A value approaching 0 indicates favorable perception of environment; A value approaching 4 indicates unfavorable perception.

b Based on a Likert-type scale of 0 = "Strongly Agree," 1 = "Agree," 2 = "Uncertain," 3 = "Disagree," and 4 = "Strongly Disagree."

#12-19, #21-26, and #29 were again used to create the construct for environmental attitude in this analysis. As mentioned earlier, Table 1 contains the mean and standard deviation for each statement used to develop the construct for environmental attitude.

Students who had a favorable environmental attitude believed that information they received on the environment was fair and unbiased. Even though this relationship was significant, it was slight. Students who practiced water conservation on their own had more favorable environmental attitudes than those who did not practice water conservation.

Students' willingness to enroll in an environmental course was determined to have a significant, positive relationship with environmental attitude. Also, those in grades nine and ten were more likely to have a favorable environmental attitude than did those in grades eleven and twelve.

Correlations were also computed between environmental attitude and completion or enrollment in specific agricultural science courses. A significant, positive correlation was found between a favorable environmental attitude and enrollment or completion of AGSC 381, "Wildlife and Recreation Management." Finally, respondents who were members of one to two environmental/conservation organizations had a more favorable environmental attitude than those who were not members.

Objective four was to identify specific means by which students have gained knowledge of the environment and environmental issues. Of the 379 students, over 70% reported that they receive information about the environment from teachers and television and radio, and teachers were cited as the resources most often utilized by the respondents. When asked from which source they would most like to receive information on the environment, a majority said that they would like to receive the information from their teachers. Parents were listed as the least likely source from which students would like to receive information on the environment. Of the students surveyed, 48% responded that their Agricultural Science class was the course in which they learn most about the environment.

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions are based on the major findings of the study:

1. Over-all, agriscience students in Texas had a favorable environmental attitude. Those with favorable environmental attitudes were more likely to believe that agriculture causes environmental problems. However, students with favorable environmental attitudes believed that agriculturists are concerned about the environment. Also, students with favorable environmental attitudes believed that information they received on the environment was fair and unbiased.

2. Agriscience students who had completed and/or enrolled in AGSC 381, "Wildlife Recreation and Management," were more likely to have a favorable environmental attitude than students who had not enrolled in the course.

3. Agriscience students preferred to receive information on the environment from their teachers more than any other source.

Based on the findings and conclusions of this study, the following recommendations were made to make environmental education more applicable to the needs of agriscience students.

1. Because agriscience students with favorable environmental attitudes felt that agriculture does cause environmental problems, environmental education included in agriscience courses must address the concerns of these students.

2. Because agriscience students believe that information they receive on the environment is fair and unbiased, effort must be made to present objective information to students so that student trust is not compromised. Further research is needed to examine what teachers are teaching in regards to environmental curricula, and to determine their environmental attitude and knowledge base.

3. Because teachers were designated as the most preferred source of information on the environment, it is of vital importance that the agriscience instructor have access to objective environmental information. Lack of adequate educational material has been reported by agriscience instructors as the greatest barrier to teaching about the environment and natural resources (Adams & Eudy, 1990).

4. Because agriscience students showed a favorable environmental attitude, longitudinal research studies are needed to determine if future agricultural and environmental policies are affected by this attitude.

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